AMENDMENTS TO THE CLAIMS

Please amend claims 1 and 3-11, and add claims 13-23 so that a complete set of the pending claims will read as follows:

1. (Currently amended) An output queuing method for forwarding packets in a ~~switch~~ switching network, the ~~switch~~ switching network containing a plurality of ~~port~~ ports, each port corresponding to a port output queue, a global output queue shared by all port output queues, a plurality of FIFO (first in first out) ~~block~~ blocks allocated to ~~each~~ all of the port output ~~queue~~ queues and to the global output queue, each of the FIFO ~~block~~ blocks comprising Nb (a natural number) FIFO nodes and a pointer, each FIFO node comprising a first field and a second field, the output queuing method comprising:

receiving a packet and identifying the type and the destination port of the received packet so as to enqueue a FIFO node relating to the received packet into one of the global output queue and the port output queues;

if the received packet is a unicast packet, setting the first and second fields of a ~~first~~ unicast FIFO node in the port output queue of the destination port, wherein the unicast FIFO node is regarded as the FIFO node relating to the received packet enqueued into the port output queue of the destination port;

if the received packet is a multicast packet,

setting the second field of a ~~second~~ multicast FIFO node in the global output queue according to the destination ports of the multicast packet, wherein the multicast FIFO node is regarded as the FIFO node relating to the received packet enqueued into the global output queue; and

setting the first field and the second field of a last ~~one of the first~~ unicast FIFO node in each port output queue so as to indicate how many multicast packets following a unicast packet related to the last unicast FIFO node in each port output queue are to be skipped and dequeued, respectively;

when the received packet is the unicast packet and is being processed,

reading the first field and the second field in the ~~first~~ unicast FIFO node corresponding to the unicast packet and sending out the unicast packet; and

sending out or skipping ~~the~~ at least a multicast packet following the received packet according to the first field and the second field of the ~~first~~ unicast FIFO node and the second field of the ~~second~~ multicast FIFO node related to the multicast packet following the received packet.

2. (Original) A method according to claim 1, wherein each FIFO node further comprises a third field, and the third field is 0 when the packet is a unicast packet and the third field is 1 when the packet is multicast packet.

3. (Currently amended) A method according to claim 1, wherein the step of setting the first field and the second field of the ~~first~~ last unicast FIFO node in each port output queue comprises:

incrementing the first field of the last unicast FIFO node by 1 if the corresponding port output queue is not one of the destination ports of the received multicast packet and the second field of the last unicast FIFO node is 0;

incrementing the second field of the last unicast FIFO node by 1 if the corresponding port output queue is not one of the destination ports of the received multicast packet and the second field of the last unicast FIFO node is not 0; and

incrementing the second field of the last unicast FIFO node by 1 if the output queue is one of the destination ports of the multicast packet.

4. (Currently amended) A method according to claim 1, wherein the step of reading the first field and the second field of the ~~first~~ unicast FIFO node comprises:

reading the first field and the second field of the unicast FIFO node into a first register and a second register.

5. (Currently amended) A method according to claim 4, wherein the step of sending out or skipping at least the multicast packet following the received packet comprises:

skipping m multicast packets from the global output queue wherein m (0 or a natural number) is the value in the first register; and

sending out or skipping n (0 or a natural number) multicast packets from the global output queue wherein n is the value in the second register.

6. (Currently amended) A method according to claim 5, wherein if the second field of the ~~second~~ multicast FIFO node following the received packet directs that the port output queue of the received packet is one of the destination ports of the multicast packet, one of the n multicast packets is sent out or skipped.

7. (Currently amended) A method according to claim 6, wherein the step of sending out at least the multicast packet following the received packet comprises:

releasing the ~~second~~ multicast FIFO node if the second field of the ~~second~~ multicast FIFO node comprises only one bit of 1;

clearing one related bit if the second field of the ~~second~~ multicast FIFO node comprises two or more bits of 1; and

releasing the corresponding FIFO block until all ~~second~~ multicast FIFO nodes in the corresponding FIFO block are all released.

8. (Currently amended) A method according to claim 1, wherein the step of sending out the unicast packet further comprises:

releasing the ~~first~~ unicast FIFO node;

releasing the FIFO block until all ~~first~~ unicast FIFO nodes in the FIFO block are all released.

9. (Currently amended) A method according to claim 1, wherein each port output queue comprises a first head pointer pointing to one of the ~~first~~ unicast FIFO nodes in the port output queue.

10. (Currently amended) A method according to claim 1, wherein each port output queue comprises a first tail pointer pointing to one of the ~~first~~ unicast FIFO nodes in the port output queue.

11. (Currently amended) A method according to claim 1, wherein the global output queue comprises a plurality of second head pointers and a second tail pointer, wherein each second head pointer is one-to-one related to each port output queue and points to one of the ~~second~~ multicast FIFO nodes in the global output queue related to each port output queue; and the second tail pointer points to one of the ~~second~~ multicast FIFO nodes in the global output queue.

12. (Original) An output queuing method for forwarding packets in a switch network, the switch network containing a plurality of port, each port corresponding to a port output queue, a global output queue shared by all port output queues, the packets being of the type of unicast or multicast, the output queuing method comprising:

detecting the type of a receiving packet;

if the type of the receiving packet is unicast, allocating the receiving packet into the port output queue;

if the type of the receiving packet is multicast, allocating the receiving packet into the global output queue; and

determining to dequeue or skip the receiving packet in the global output queue according to the type of the receiving packet.

13. (New) An output queuing method for forwarding packets in a switching network having a plurality of ports, the method comprising:

providing a plurality of port output queues, each port output queue corresponding to one of the ports for a plurality of unicast nodes to be enqueued in order to forward

corresponding unicast packets, wherein each unicast node comprises a multicast count field and the corresponding unicast packet is destined to one of the ports;

providing a global output queue shared by all of the port output queues for a plurality of multicast nodes to be enqueued in order to forward corresponding multicast packets, wherein each multicast packet is destined to corresponding ones of the ports, and the multicast node corresponding to the multicast packet comprises an output port field indicative of the corresponding ones of the ports;

in response to an incoming packet,

if the incoming packet is unicast, enqueuing a unicast node corresponding to the incoming packet into a corresponding one of the port output queues, wherein the multicast count field of the unicast node corresponding to the incoming packet is initialized for counting how many multicast nodes corresponding to multicast packets that follow the incoming packet are enqueued into the global output queue; and

if the incoming packet is multicast,

enqueuing a multicast node corresponding to the incoming packet into the global output queue; and

for each of the port output queues, setting the multicast count field of a unicast node which is last enqueued to indicate how many multicast nodes corresponding to multicast packets that follow a corresponding unicast packet of the last enqueued unicast node have been enqueued into the global output queue;

for each of the port output queues with a unicast node that is first enqueued,

dequeuing the first enqueued unicast node from the port output queue;

sending out a corresponding unicast packet of the first enqueued unicast node; and

determining whether to perform multicast packet forwarding from the global output queue according to the first enqueued unicast node.

14. (New) A method according to claim 13, wherein after determining whether to perform multicast packet forwarding from the global output queue, the method further comprises:

if the multicast count field of the first enqueued unicast node indicates that at least a multicast packet follows the corresponding unicast packet of the first enqueued unicast node, and if the output port field of a multicast node corresponding to the multicast packet which follows the corresponding unicast packet of the first enqueued unicast node indicates that the multicast packet of the multicast node is destined to at least one destination port to which the corresponding unicast packet of the first enqueued unicast node is destined:

dequeuing the multicast node corresponding to the multicast packet which follows the corresponding unicast packet of the first enqueued unicast node; and

sending out the multicast packet which follows the corresponding unicast packet of the first enqueued unicast node to the destination port.

15. (New) A method according to claim 13, wherein after determining whether to

perform multicast packet forwarding from the global output queue, the method further comprises:

if the multicast count field of the first enqueued unicast node indicates that at least a multicast packet follows the corresponding unicast packet of the first enqueued unicast node, and if the output port field of a multicast node corresponding to the multicast packet following the corresponding unicast packet of the first enqueued unicast node indicates that the multicast packet of the multicast node is not destined to the port to which the corresponding unicast packet of the first enqueued unicast node is destined,

skipping at least the multicast node corresponding to the multicast packet following the corresponding unicast packet of the first enqueued unicast node.

16. (New) A method according to claim 13, wherein each unicast node of each port output queue further comprises a skip count field for counting how many multicast packets following the corresponding unicast packet of the unicast node are enqueued into the global output queue but are not destined to the port to which the corresponding packet of the unicast node is destined.

17. (New) A method according to claim 16, wherein after enqueuing the multicast node corresponding to the incoming packet into the global output queue, the method further comprises:

setting the skip count field of the last enqueued unicast node of each port output queue to indicate how many multicast nodes corresponding to multicast packets that follow the corresponding unicast packet of the last enqueued unicast node but are not destined to a

destination port thereof have been enqueued into the global output queue.

18. (New) A method according to claim 16, wherein after determining whether to perform multicast packet forwarding from the global output queue, the method further comprises:

if the skip count field of the first enqueued unicast node indicates that at least a multicast packet follows the corresponding unicast packet of the first enqueued unicast node but is not destined to a destination port to which the corresponding unicast packet of the first enqueued unicast node is destined, skipping at least the multicast node.

19. (New) A method according to claim 13, wherein each of the global output queue and port output queues comprises at least one first-in-first-out (FIFO) block having a plurality of link nodes.

20. (New) An apparatus for packet forwarding in a switching network having a plurality of ports, the apparatus comprising:

a queue control module for providing a plurality of port output queues for unicast packet forwarding in the corresponding ports, and providing a global output queue shared by all of the port output queues for multicast packet forwarding;

an input control module, in response to an incoming packet, for buffering the incoming packet and enqueuing a node corresponding to the incoming packet into one of the global output queue and the port output queues, wherein when the incoming packet is unicast, the node comprises a multicast count field and is enqueued into a corresponding

one of the port output queues which corresponds to a destination port of the incoming packet, and when the incoming packet is multicast, the node comprises a port mask field indicative of destination ports of the incoming packet and is enqueued into the global output queue; and

an output control module, for each of the port output queues, for dequeuing a node that is first enqueued, sending out a unicast packet corresponding to the first enqueued node, and determining whether to perform multicast packet forwarding from the global output queue according to the first enqueued node;

wherein when the node corresponding to the incoming packet is enqueued into is the corresponding one of the port output queues, the queue control module counts how many nodes corresponding to multicast packets that follow the incoming packet are enqueued into the global output queue;

wherein when the node corresponding to the incoming packet is enqueued into the global output queue, the queue control module, for each port output queue, sets the multicast count field of a node that is last enqueued into the port output queue to a value indicating how many nodes corresponding to multicast packets that follow the last enqueued node are enqueued into the global output queue.

21. (New) An apparatus according to claim 20, wherein when the output control module dequeues the first enqueued node, the queue control module detects the multicast count field to determine whether to inform the output control module to dequeue a node corresponding to a multicast packet that follows the unicast packet corresponding to the first enqueued node from the global output queue.

22. (New) An apparatus according to claim 21, wherein if the queue control module detects that the multicast packet which follows the unicast packet corresponding to the first enqueued node has a destination port identical to that of the unicast packet corresponding to the first enqueued node according to the port mask field of the node corresponding to the multicast packet, the queue control module informs the output control module to dequeue the node corresponding to the multicast packet which follows the unicast packet corresponding to the first enqueued node from the global output queue and to send out the multicast packet which follows the unicast packet corresponding to the first enqueued node.

23. (New) An apparatus according to claim 21, wherein if the queue control module detects that the multicast packet which follows the unicast packet corresponding to the first enqueued node is not destined to a destination port to which the unicast packet corresponding to the first enqueued node is destined according to the port mask field of the node corresponding to the multicast packet, the queue control module informs the output control module to skip the node corresponding to the multicast packet from the global output queue.